

**Highlights of 4th Lecture of the Distinguished Lecture Series Organized
by INAE Bhubaneswar Chapter, SOA University & IMMT Bhubaneswar on 7th March 2022.**

Title: India's Self Sufficiency in Materials of 21st Century

Speaker: Dr. Debashish Bhattacharjee, Vice President Technology and New Materials Business

Keypoints:

- Policy framework to be created to promote market for advance materials
- India should see itself as a manufacturing hub for the entire world market
- Encourage through funding collaborative technology development between industry, government, academia and MSME
- Ensure academic research supports technology development in new materials
- Design thinking for sustainable use of materials
- Need for independence in strategic materials
- Driven by aerospace, wind energy, sports, automotive
- As volume grows, cost will decrease
- Future of Graphene
- Titanium- an opportunity waiting

Post COVID re-alignment

- Global to local
- Important of medical materials and devices

Growth drives for the Indian market

- Anticipated disease burden
- 2011 census showed population above 60 years 104 mn
- 2025 expected 200mn
- Rise in per capital income
- Global average: \$ 47
- India: \$3
- Underpenetrated health services (reverse trend)
- 69% of India is rural: 73% of practicing surgeons are urban
- Opportunity to brand and educate

Manufacturing scenario

- 750 manufacturers in the space
- 95% of manufacturers have turnover below INR 150 corers per annum
- Indian manufacturers' quality is inconsistent
- Even the basic materials such as hydroxyapatite are imported

Titanium- an opportunity waiting

- 3rd largest
- In the world- India's position in Ti raw materials deposits 600Mt of limonite, 61Mt of Rutile
- 500 T
- India's annual Ti production. Global production: -75000 T Less than 1% of global production
- \$22/kg
- The cost of Indian Ti metal. International price: \$9/kg Suboptimal scale, no mg recycling

One imported energy source versus another set

- 83% Oil imported: \$ 63.3 bn net outgo in 2017-18
- In renewable-dependent, battery economy, materials imported Li, Ni, Co
- Anode material- Needle coke – mostly imported from China.
- Li resources in Chile, Co in Congo, Chinese dominance.

Energy materials- search for local sources

- Lateritic ores (overburdens) –Source of Ni and Co
- Mn ores indigenous –Purification of Mn ores
- Lean Li ores
- Urban Mining

Gas and opportunity in the space of Rare Earth Elements (REE)

- Public private partnership for manufacture of intermediate products
 1. Oxide to metal is gap
 2. Metals to magnets is a gap
 3. Recycling is a gap
- Recovery of rare-earths from e-waste and coal fly ash
- Putting up a Graphene manufacturing plant of 100 TPA capacity
- Exploring new application areas
- Exploring markets in specialized apparels, packing, and energy
- The entire ecosystem of 0-9 TRL (Technology Readiness Level) was developed internally within the company